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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,343	08/31/2006	Masaru Sasaki	295715US26PCT	9501
22850 7590 04/01/2010 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER MALEK, MALIHEH				
ART UNIT 2813		PAPER NUMBER		
NOTIFICATION DATE 04/01/2010		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/591,343

**Applicant(s)**

SASAKI ET AL.

**Examiner**

MALIHEH MALEK

**Art Unit**

2813

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 7, 8 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 8 and 10-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08/31/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notes of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This office action is in response to the amendment filed on 12/04/2009. Claims 1-3, 7-8 and 10-13 are pending in this application. Applicant canceled claims 4-6 & 9, and added new claims 10-13. Applicant also amended claims 1 and 7.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

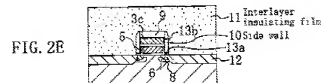
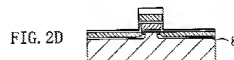
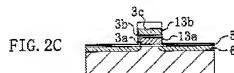
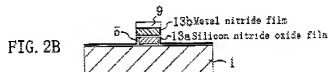
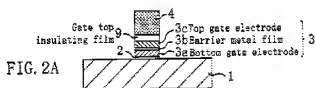
The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: (***See MPEP Ch. 2141***)

- a. Determining the scope and contents of the prior art;
- b. Ascertaining the differences between the prior art and the claims in issue;
- c. Resolving the level of ordinary skill in the pertinent art; and
- d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-3, 7-8 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segawa et al. (Pub. No. US 2001/0020707 A1), herein Segawa, in view of Verhaverbeke et al. (Pat. No.: US 7,159,599 B2), herein Verhaverbeke.

Regarding claim 1, Segawa teaches a method for manufacturing a prescribed semiconductor device by forming a film mainly formed of tungsten and a film of silicon on a semiconductor substrate, comprising: forming a first layer 3a, which is formed of the film of the silicon, on the semiconductor substrate; forming a second layer 3b/3c, which is formed of the film mainly formed of the tungsten, on the semiconductor substrate; and selectively forming an oxide film 5 on an exposed surface of the first layer by plasma processing using a process gas containing an oxygen gas so as not to form the oxide film on an exposed surface of the second layer ([0061]-[0062] and Figs. 2A-2E).



Regarding claim 1, Segawa does not expressly teach a plasma processing at a process temperature of 300°C or more using a process gas containing an inert gas and hydrogen gas at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less.

In the same field of endeavor, regarding claim 1, Verhaverbeke teaches a plasma oxidation process comprising a process temperature of 300°C or more using a process gas containing an inert gas, oxygen gas and hydrogen gas at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less to provide a hydrogen rich mixture (col. 28, lines 30-31, col. 39, lines 43-55, and col. 43, lines 40-49). In any case, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed flow rate ratio range. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, *In re Aller*, 105 USPQ 233 (CCPA 1955). The claim(s) is(are) obvious without showing that the claimed range(s) achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and

unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the flow rate ratio of the Verhaverbeke for the method of Segawa to provide a hydrogen rich mixture in the oxidation process.

Regarding claim 2, Segawa teaches a method for manufacturing a semiconductor device wherein the semiconductor device is a transistor, and a gate electrode is formed of the first layer and the second layer ([0060]).

Regarding claim 3, Segawa teaches a method for manufacturing a semiconductor device wherein the second layer is a tungsten layer or a tungsten silicide layer ([0061]-[0062]).

Regarding claim 7, Segawa teaches a method for plasma oxidation of silicon of a semiconductor substrate on which the film 112 mainly formed of the tungsten and the film of the silicon are formed, comprising: selectively forming an oxide film on an exposed surface of the film of the silicon by plasma processing using a process gas containing oxygen gas and hydrogen gas so as not to form the oxide film on an exposed surface of the film mainly formed of the tungsten ([0061]-[0062] and Figs. 2A-2E).

Regarding claim 7, Segawa does not expressly teach a plasma processing at a process temperature of 300°C or more using a process gas containing an inert gas and hydrogen gas at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less.

In the same field of endeavor, regarding claim 7, Verhaverbeke teaches a plasma oxidation process comprising a process temperature of 300°C or more using a process gas containing an inert gas, oxygen gas and hydrogen gas at a flow rate ratio (hydrogen gas flow rate/oxygen gas flow rate) of the hydrogen gas to the oxygen gas of 2 or more and 4 or less to provide a hydrogen rich mixture (col. 28, lines 30-31, col. 39, lines 43-55, and col. 43, lines 40-49). In any case, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed flow rate ratio range. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, *In re Aller*, 105 USPQ 233 (CCPA 1955). The claim(s) is(are) obvious without showing that the claimed range(s) achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and

unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the flow rate ratio of the Verhaverbeke for the method of Segawa to provide a hydrogen rich mixture in the oxidation process.

Regarding claim 8, Segawa in view of Verhaverbeke teaches a plasma oxidation method, wherein the plasma is excited by a microwave to energize the gases (Verhaverbeke: col. 7, lines 15-36, col. 16, lines 42-45).

Regarding claim 10, Segawa teaches a method for manufacturing a semiconductor device, wherein the first layer is a polysilicon layer ([0061]-[0062]).

Regarding claims 11-12, applicant is referred to the rejection applied to claims 1 and 7.

Regarding claim 13, Segawa in view of Verhaverbeke teaches a method for plasma processing, wherein the supplying an inert gas, oxygen gas and hydrogen gas are the only gases supplied into the chamber to generate the plasma (col. 28, lines 30-31, col. 39, lines 43-55, and col. 43, lines 40-49, for the purpose of plasma oxidation, Verhaverbeke uses only the above three gases).



***Response to Arguments***

3. Applicant's arguments with respect to claims 1-3, 7-8 and 10-13 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MALIHEH MALEK whose telephone number is (571)270-1874. The examiner can normally be reached on Mon-Fri, 8:30-6pm ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Landau can be reached on (571)272-1731. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 24, 2010

/M. M./  
Examiner, Art Unit 2813

/W. David Coleman/  
Primary Examiner, Art Unit 2823